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D. E. SALMON, D. V. M., Chief of Bureau.

DISEASES OF THE STOMACH AND BOWELS OF CATTLE.^a

By A. J. MURRAY, M. R. C. V. S.

[Revised in 1904 by Leonard Pearson, B. S., V. M. D.]

ACUTE TYMPANITES (HOVEN, OR BLOATING).

This disease is characterized by swelling of the left flank, and is caused by the formation of gas in the rumen, or paunch.

Causes.—Tympanites may be caused by any kind of food which produces indigestion. When cattle are first turned into young clover they eat so greedily of it that tympanites frequently results; turnips, potatoes, and cabbage may also cause it; middlings and corn meal also frequently give rise to it. In this connection it may be stated that an excessive quantity of any of the before-mentioned foods may bring on this disorder, or it may not be due to excess, but to eating too hastily. Sometimes the quality of the food is at fault. Grass or clover when wet by dew or rain frequently disorders digestion and brings on tympanites; frozen roots or pastures covered with hoar frost should also be regarded as dangerous. When food has been eaten too hastily, or when it is cold and wet, the digestive process is imperfectly performed, and the food contained in the paunch ferments, during which process large quantities of gas are formed. The same result may follow when a cow is choked, as the obstruction in the gullet prevents the eructation, or passing up, of gas from the stomach, so that the gas continues to accumulate until tympanites results.

Symptoms.—The swelling of the left flank is very characteristic, as in well-marked cases the flank at its upper part rises above the level of the backbone and when struck with the tips of the fingers emits a drum-like sound. The animal has an anxious expression, moves uneasily, and is evidently distressed. If relief is not obtained in time, it breathes with difficulty, reels in walking or in standing, and in a short time falls down and dies from suffocation. The distention of the stomach may become so great as to prevent the animal from breathing, and in some instances the case may be complicated by rupture of the stomach.

^a Reprint from Special Report on Diseases of Cattle. 1904.

Treatment.—If the case is not extreme, it may be sufficient to drive the animal at a walk for a quarter or half an hour; or cold water by the bucketful may be thrown against the cow's sides. In some cases the following simple treatment is successful: A rope or a twisted straw band is coated with pine tar, wagon grease, or other unsavory substance, and is placed in the cow's mouth as a bit, being secured by tying behind the horns. The efforts of the animal to dislodge this object result in movements of the tongue, jaws, and throat that stimulate the secretion of saliva and swallowing, thus opening the esophagus, which permits the exit of gas, and at the same time peristalsis is stimulated reflexly. In urgent cases the gas must be allowed to escape without delay, and this is best accomplished by the use of the trocar. The trocar is a sharp-pointed instrument incased in a sheath, which leaves the sharp point of the trocar free. In selecting the point for using the trocar a spot equally distant from the last rib, the hip bone, and the transverse processes of the lumbar vertebræ must be chosen. Here an incision about three-fourths of an inch long should be made with a knife through the skin, and then, the sharp point of the trocar being directed downward, inward, and slightly forward, is thrust into the paunch. The sheath of the trocar should be left in the paunch so long as any gas continues to issue from it. If the canula, or sheath, of the trocar is removed while gas is still forming in the paunch and the left flank becomes considerably swollen, it may be necessary to insert it again. It is well, accordingly, to observe the canula closely, and if gas is found to be issuing from it, it should not be removed. When gas issues from the canula in considerable quantity the sound accompanying its escape renders the exact condition obvious. It is occasionally necessary to keep the canula in the stomach for several hours. When this is necessary a piece of stout cord should be passed round the neck of the canula immediately below the projecting rim, and then be passed round the animal's body and tied in a secure knot, and a careful attendant must remain with the cow during the entire period that the instrument is in place. The rim surrounding the mouth of the canula should be in contact with the skin. Whenever the person in charge of the cow is satisfied that gas has ceased to issue from the canula the instrument should be removed.

The canula is to be employed only in extreme or urgent cases, though everyone who has had experience in treating indigestion in cattle will realize that he has saved the lives of many animals by its prompt application. When the tympanitic animal is not distressed and the swelling of the flank is not great, or when the most distressing condition has been removed by the use of the trocar, it is best to resort to the administration of internal medicine. Two ounces of

aromatic spirits of ammonia should be given every half hour in a quart of cold water, or half an ounce of chloride of lime may be dissolved in a pint of tepid water and the dose repeated every half hour until the bloating has subsided. It is generally necessary to give a dose of purgative medicine after bloating has subsided, as animals frequently show symptoms of constipation after attacks of indigestion. For this purpose 1 or 1½ pounds of Glauber's salts may be used.

CHRONIC TYMPANITES.

Cattle, especially those which have been kept in the stable all winter, are liable to suffer from chronic tympanites. In this form the animal bloats up after feeding, but seldom swells so much as to cause any alarm. The chronic form of indigestion may also follow an acute attack like that previously described. This is also a symptom of tuberculosis in those cases in which the lymphatic glands lying between the lungs are so enlarged as to press upon and partly occlude the esophagus.

Treatment.—Treatment should be preceded by a moderate dose of purgative medicine: 1 pound of sulphate of magnesia or sulphate of soda (Glauber's salts), half an ounce of powdered Barbados aloes, 1 ounce of powdered ginger, 1 pint of molasses. The powder should be stirred up for a few minutes with 2 quarts of lukewarm water, then the molasses should be added; and after all the ingredients have been stirred together for about ten minutes, the dose should be administered. It will generally be necessary after the operation of the purgative to give some tonic and antacid preparation to promote digestion, which is imperfectly performed in such cases. The following may be used: Powdered gentian, 3 ounces; powdered bicarbonate of potash, 3 ounces; powdered ginger, 3 ounces; powdered capsicum, 1 ounce. Mix and divide into twelve powders, one of which should be given three times a day before feeding, shaken up with half a pint of whisky and a pint of water. It is also advantageous in such cases to give two heaped teaspoonfuls of wood charcoal, mixed with the animal's feed three times a day. The animal should also go out during the day, as want of exercise favors the continuance of this form of indigestion. If the dung is hard, the constipation should be overcome by feeding a little flaxseed twice daily or by giving a handful of Glauber's salts in the feed once or twice daily, as may be necessary. Roots, silage, and other succulent feeds are useful in this connection. If tuberculosis is suspected as the cause of the chronic bloating, a skilled veterinarian should be employed to make a diagnosis, using the tuberculin test if necessary. Until it is settled that the cow has not tuberculosis, she should be kept apart from the other members of the herd.

DISTENTION OF RUMEN, OR PAUNCH, WITH FOOD.

This form of indigestion is caused by the animal gorging itself with food, and arises more from the animal's voracious appetite than from any defect in the quality of the food supplied to it. The condition is, however, more severe if the food consumed is especially concentrated or difficult of digestion. In cases of this kind there is comparatively no great formation of gas, and the gas which is formed is diffused through the stomach instead of accumulating in a layer in its upper part. On pressing the flank with the closed fist the indent of the hand remains for a short time in the flank, as if the rumen were filled with a soft, doughy mass.

This form of indigestion should be treated by stimulants, such as alcohol, wine, or aromatic spirits of ammonia. But if the treatment applied fails and the impacted or overloaded condition of the rumen continues, it may become necessary to make an incision with a sharp, long-bladed knife in the left flank, commencing at the point where it is usual to puncture the stomach of an ox, and prolong the incision in a downward direction until it is long enough to admit the hand. When the point of the knife is thrust into the flank and the blade cuts downward, the wall of the stomach, the muscle, and the skin should all be cut through at the same time. Two assistants should hold the edges of the wound together so as to prevent any food slipping between the flank and the wall of the stomach, and then the operator should remove two-thirds of the contents of the rumen. This having been done, the edges of the wound should be sponged with a little carbolized warm water, and, the lips of the wound in the rumen being turned inward, they should be brought together with catgut stitches. The wound penetrating the muscle and the skin may then be brought together by silk stitches, which should pass through the entire thickness of the muscle and should be about 1 inch apart. The wound should afterwards be dressed once a day with a lotion and the animal covered with a tight linen sheet, to protect the wound from insects and dirt. The lotion to be used in such a case is made up as follows: Sulphate of zinc, 1 dram; carbolic acid, 2 drams; glycerine, 2 ounces; water, 14 ounces; mix. It is clear that this operation requires special skill and it should be attempted only by those who are competent.

LOSS OF CUD.

It is very common among farmers, when a cow or ox is ailing, to say that the sick animal has lost its cud. If it is meant that the animal does not ruminate or chew the cud, and that it consequently must be sick, no fault can be found with the expression. In most cases, however, the remark is not intended to convey the idea that the

animal does not ruminate, but that the loss of cud is a disease in itself; that the cud has actually been dropped from the mouth and lost, and that for this reason the cow can not ruminate. We may here observe that loss of cud is a symptom of suspended rumination, and shows that the animal's digestive functions are not performed as regularly as usual. It is a symptom of a great many diseases, and when its existence is detected it should lead the observer to try to discover other symptoms upon which to base a correct opinion as to the nature of the disease from which the animal suffers.

VOMITING.

This is not to be confounded with rumination, though some writers have advanced the opinion that vomiting is merely a disordered and irregular rumination. It is not of common occurrence in cattle, though it sometimes occurs.

Symptoms.—Animals which vomit are frequently in poor condition. After having eaten tranquilly for some time the animal suddenly becomes uneasy, arches the back, stretches the neck and head, and then suddenly ejects 10 or 12 pounds of the contents of the rumen. After having done this the uneasiness subsides, and in a short time the animal resumes eating as if nothing had happened.

Cause.—The cause of this disordered state of the digestive system in cattle is usually obscure, but has in some cases been traced to a partial closure of the opening into the second stomach or to a distention of the esophagus. It has been found to occur when there was cancerous disease of the fourth stomach, and experimentally it has been shown that a suspension of digestion or great derangement of the fourth stomach produces considerable nervous disorder of the rumen and sometimes vomiting or attempt to vomit.

Treatment.—Easily digested food and plenty of water should be given. Fear and excitement, chasing, or hurrying animals after eating heartily are apt to bring on this result. In order to overcome irritation which may produce vomiting, the following draft should be given: Hydrate of chloral, half an ounce; whisky, 8 ounces; water, 1 pint. The dose must be repeated when the condition of the animal seems to require it. As a rule, treatment is not successful.

DEPRAVED APPETITE (PICA).

Cattle suffering from this disease have a capricious and variable appetite as regards their ordinary food, but evince a strong desire to lick and eat substances for which healthy cattle show no inclination. Alkaline and saline-tasting substances are especially attractive to cattle having a depraved appetite, and they frequently lick lime, earth, coal, gravel, and even the dung of other cattle. Cows in calf and

young cattle are especially liable to develop these symptoms. Animals affected in this way lose condition, their coat is staring, gait slow, and small vesicles containing yellow liquid form under the tongue; the milk given by such cows is thin and watery. Such animals become restless and uneasy, as is indicated by frequent bellowing. The disease may last for months, the animal ultimately dying emaciated and exhausted. Depraved appetite frequently precedes the condition in which the bones of cattle become brittle and fracture easily, which is known as osteomalacia.

Causes.—It is generally believed, from the fact that this disease is largely one of regions, that some condition of the soil and water and of the local vegetation is responsible for it. It is more prevalent some years than others, and is most common in old countries where the soil is more or less depleted. Cattle pastured on low, swampy land become predisposed to it. It occasionally happens, however, that one individual in a herd suffers though all are fed alike; in such cases the disease must arise from an imperfect assimilation by the affected animal of the nutritive elements of the food which is supplied to it.

Treatment.—The aim in such cases must be to improve the process of digestion and to supply the animal with a sufficiency of sound and wholesome food. The following should be given to the cow three times a day, a heaped tablespoonful constituting a dose: Carbonate of iron, 4 ounces; finely ground bone or "bone flour," 1 pound; powdered gentian, 4 ounces; common salt, 8 ounces; powdered fenugreek, 4 ounces; mix. In addition to this, 3 tablespoonfuls of powdered charcoal may be mixed with the animal's food three times a day, and a piece of rock salt should be placed where the animal can lick it at will. German veterinarians have had brilliant results from the treatment of this disease with subcutaneous injections of apomorphine in doses of $1\frac{1}{2}$ to 5 grains daily for three or four days.

HAIR CONCRETIONS.

These concretions, or hair balls, result from the habit which cattle have of licking themselves or other animals. The hairs which are swallowed are carried round by the contractions of the stomach and sometimes gradually assume the form of a small pellet, or ball. These increase in size as fresh quantities of hair are introduced into the stomach, which become adherent to the surface of the hair ball. These hair balls are found most frequently in the reticulum, or second stomach, though sometimes in the rumen. In calves hair balls are generally found in the fourth stomach. There are no certain symptoms by which we can determine the presence of hair balls in the stomach, and therefore no treatment can be recommended for such cases. In making postmortem examinations of cattle, we have some-

times found the walls of the reticulum transfixed with nails or pieces of wire, and yet the animal during life had not shown any symptoms of indigestion, but had died from maladies not involving the second stomach.

INDIGESTION (DYSPEPSIA, OR GASTROINTESTINAL CATARRH).

Tympanites, already described, is a form of indigestion in which the chief symptom and most threatening condition is the collection of gas in the paunch. This symptom does not always accompany indigestion, so it is well to here consider other forms under a separate head. If indigestion is long continued the irritant abnormal products developed cause catarrh of the stomach and intestines—gastrointestinal catarrh. Or, on the other hand, irritant substances ingested may cause gastrointestinal catarrh, which, in turn, will cause indigestion. Hence it results that these several conditions are usually found existing together.

Causes.—Irritant food, damaged food, overloading of the stomach, and sudden changes of diet may cause this disease. Want of exercise predisposes to it, or food which is coarse and indigestible may after a time produce this condition. Food which possesses astringent properties and tends to check secretion may also act as an exciting cause. Food in excessive quantity may lead to disorder of digestion and to this disease. It is very likely to appear toward the end of protracted seasons of drouth, therefore a deficiency of water must be regarded as one of the conditions which favor its development.

Symptoms.—Diminished appetite, rumination irregular, tongue coated, mouth slimy, dung passed apparently not well digested and smelling badly, dullness, and fullness of the flanks. The disease may in some cases assume a chronic character, and in addition to the foregoing symptoms slight bloating, or tympanites, of the left flank may be observed; the animal breathes with effort and each respiration may be accompanied by a grunt, the ears and horns are alternately hot and cold, rumination ceases, the usual rumbling sound in the stomach is not audible, the passage of dung is almost entirely suspended, and the animal passes only a little mucus occasionally. Sometimes there is alternating constipation and diarrhea. There is low fever in many cases.

The disease continues a few days or a week in the mild cases, while the severe cases may last several weeks. In the latter form the emaciation and loss of strength may be very great. There is no appetite, no rumination, or peristalsis. The mouth is hot and sticky, the eyes have receded in their sockets, and milk secretion has ceased. In such cases the outlook for recovery is unfavorable. The patient falls away in flesh and becomes weaker, as is shown by the fact that one frequently finds it lying down.

On examining animals which have died of this disease it is found that the lining membrane of the fourth stomach and the intestines, particularly the small intestines, is red, swollen, streaked with deeper red or bluish lines or spotted. The lining of the first three stomachs is more or less softened and may easily be peeled off. The third stomach (psalter) contains dry, hard food masses closely adherent to its walls.

In some cases the brain appears to become disordered, probably from the pain and weakness and from the absorption of toxins generated in the digestive canal. In such cases there is weakness and an unsteady gait, the animal does not appear to take notice of and will consequently run against obstacles; after a time it falls down and gives up to violent and disordered movements. This delirious condition is succeeded by coma or stupor, and death ensues.

Treatment.—Small quantities of roots, sweet silage, or selected grass or hay should be offered several times daily. Very little food should be allowed. Aromatic and demulcent drafts may be given to produce a soothing effect on the mucous lining of the stomachs and to promote digestion. Two ounces of chamomile flowers should be boiled for twenty minutes in a quart of water and the infusion on cooling should be given to the affected animal. This may be repeated about three times a day. When constipation is present the following purgative may be administered: One pound of Glauber's salts dissolved in a quart of linseed tea and a pint of molasses. After this purgative has acted, if there is a lack of appetite and the animal does not ruminate regularly, the powder mentioned in remarks on the treatment of chronic tympanites may be given according to directions. The diet must be rather laxative and of a digestible character after an attack of this form of indigestion. Food should be given in moderate quantities, as any excess by overtaking the digestive functions may bring on a relapse.

INDIGESTION FROM DRINKING COLD WATER (COLIC).

This disorder is produced by drinking copiously of cold water, which arrests digestion and produces cramp of the fourth stomach, probably of the other stomachs, and also of the bowels.

Causes.—It is not customary for the ox to drink much water at once. In fact, he usually drinks slowly and as if he were merely tasting the water, letting some fall out at the corners of his mouth at every mouthful. It would, therefore, seem to be contrary to the habits of the ox to drink largely; but we find that during hot weather, when he has been working, and is consequently very thirsty, if he drinks a large quantity of cold water he may be immediately taken with a very severe colic. Cows which are fed largely on dry hay

drink copiously, like the working ox, and become affected in precisely the same manner. In such cases they are seized with a chill or fit of trembling before the cramps come on.

Symptoms.—There is some distention of the abdomen, but no accumulation of gas. As the distention and pain occur immediately after the animal has drunk the water, there can be no doubt as to the exciting cause.

Treatment.—Walk the animal about for ten minutes before administering medicine, as this allows time for a portion of the contents of the stomach to pass into the bowel, and renders it safer to give medicine. In many cases the walking exercise and the diarrhea bring about a spontaneous cure of this disorder, but as in some instances the cramps and pains of the stomachs persist, one may give 1 ounce of sulphuric ether and 1 ounce of tincture of opium, shaken up with a pint of warm water, and repeat the dose in half an hour if the animal is not relieved. In an emergency when medicine is not to be had, half a pint of whiskey may be substituted for medicine, and should be given mixed with a pint of warm water; or a tablespoonful of powdered ginger may be administered in the same way as the remedies already mentioned.

INDIGESTION IN CALVES (GASTROINTESTINAL CATARRH, DIARRHEA, OR SCOUR).

Sucking calves are subject to a form of diarrhea to which the above designations have been applied.

Causes.—Calves which suck their dams are not frequently affected with this disease, though it may be occasioned by their sucking at long intervals, and thus overloading the stomach and bringing on indigestion, or from improper feeding of the dam on soft, watery, or damaged foods. Suckling the calf at irregular times may also cause it. Exposure to damp and cold is a potent predisposing cause. Calves which are separated from their dams and which receive considerable quantities of cold milk at long intervals are liable to contract this form of indigestion. Calves fed on artificial food, used as a substitute for milk, frequently contract it. Damaged food, sour or rotten milk, milk in dirty cans, skim milk from a dirty creamery skim-milk vat, skim milk hauled warm, exposed to the sun, and fed from unclean buckets, may all cause this disease.

Symptoms.—The calf is depressed; appetite is poor; sometimes there is fever; the extremities are cold. The dung becomes gradually softer and lighter in color until it is cream colored and little thicker than milk. It has a most offensive odor and may contain clumps of curd. Later it contains mucus and gas bubbles. It sticks to the hair of the tail and buttocks, causing the hair to drop off and

the skin to become irritated. There may be pain on passing dung and also abdominal or colicky pain. The calf stands about with the back arched and belly contracted. There may be tympanites. Great weakness ensues in severe cases, and without prompt and successful treatment death soon follows.

Treatment.—Remove the cause. Give appropriate food of best quality in small quantities. Make sure that the cow furnishing the milk is healthy and is properly fed. Clean all milk vessels. Clean and disinfect the stalls. For the diarrhea give two raw eggs, or a cup of strong coffee, or two ounces of blackberry brandy. If the case is severe, give 1 ounce of castor oil with a teaspoonful of creolin and 20 grains of subnitrate of bismuth. Repeat the bismuth and creolin with blackberry brandy and flaxseed tea every four hours. Tannopin may be used in dose of 15 to 30 grains.

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